FD-GAN: Generative Adversarial Networks with Fusion-discriminator for Single Image Dehazing

Year: 2020 | Citations: 272 | Authors: Yu Dong, Yihao Liu, He Zhang, Shifeng Chen, Y. Qiao

---

Abstract

Recently, convolutional neural networks (CNNs) have achieved great improvements in single image dehazing and attained much attention in research. Most existing learning-based dehazing methods are not fully end-to-end, which still follow the traditional dehazing procedure: first estimate the medium transmission and the atmospheric light, then recover the haze-free image based on the atmospheric scattering model. However, in practice, due to lack of priors and constraints, it is hard to precisely estimate these intermediate parameters. Inaccurate estimation further degrades the performance of dehazing, resulting in artifacts, color distortion and insufficient haze removal. To address this, we propose a fully end-to-end Generative Adversarial Networks with Fusion-discriminator (FD-GAN) for image dehazing. With the proposed Fusion-discriminator which takes frequency information as additional priors, our model can generator more natural and realistic dehazed images with less color distortion and fewer artifacts. Moreover, we synthesize a large-scale training dataset including various indoor and outdoor hazy images to boost the performance and we reveal that for learning-based dehazing methods, the performance is strictly influenced by the training data. Experiments have shown that our method reaches state-of-the-art performance on both public synthetic datasets and real-world images with more visually pleasing dehazed results.